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(54) Nitride semiconductor device

(57) A nitride semiconductor device has a nitride semiconductor layer structure. The structure includes an active layer (16) of a quantum well structure containing an indium-containing nitride semiconductor. A first nitride semiconductor layer (101) having a band gap energy larger than that of the active layer (16) is provided in contact with the active layer (16). A second nitride semiconductor layer (102) having a band gap energy smaller than that of the first layer (101) is provided over the first layer (101). Further, a third nitride semiconductor layer (103) having a band gap energy larger than that of the second layer (102) is provided over the second layer (102).

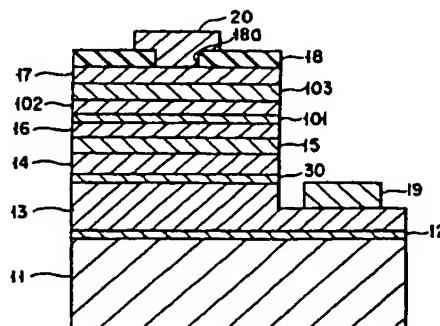


FIG. 2

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EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP 0 675 552 A (TOYODA GOSEI KK) 4 October 1995 * abstract * * column 2, line 38-42 *	52	H01L33/00 H01S3/19
E	US 5 646 953 A (NAITO HIROKI ET AL) 8 July 1997 * column 8, line 13 - column 11, line 41 * * column 21, line 18 - column 23, line 24 *	1,14,52	
A	US 4 862 471 A (PANKOVE JACQUES I) 29 August 1989 * the whole document *	1-4,8, 14-17, 32-35,48	
D,A	PATENT ABSTRACTS OF JAPAN vol. 018, no. 225 (E-1541), 22 April 1994 -& JP 06 021511 A (NIPPON TELEGR & TELEPH CORP), 28 January 1994 * abstract *	1,14,23, 32,44	
A	PATENT ABSTRACTS OF JAPAN vol. 016, no. 124 (E-1183), 30 March 1992 -& JP 03 290984 A (MATSUSHITA ELECTRON CORP), 20 December 1991 * abstract *	1-4, 8-17, 21-26, 30-35, 39-43	TECHNICAL FIELDS SEARCHED (Int.Cl.6) H01L
A	PATENT ABSTRACTS OF JAPAN vol. 016, no. 567 (E-1296), 8 December 1992 -& JP 04 218994 A (TOSHIBA CORP), 10 August 1992 * abstract *	1,14	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 11 September 1998	Examiner De Laere, A
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

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